NATIONAL ENERGY SECURITY:

Implications for National Energy Policy

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Environmental and Energy Study Institute

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The Environmental and Energy Study Institute and Senator Susan Collins (R- ME) co-hosted a Congressional briefing to examine the nation's current energy system and its vulnerabilities, as well as some of the steps and solutions to providing the nation and the economy a more secure and reliable energy system. The nation's energy system is inextricably linked to national security and economic growth. As a result of recent events, new discussions have emerged regarding power plants and energy infrastructure as potential targets for terrorist attacks. Such an attack would cause major disruptions in power generation and possibly pose great risk to human life.

ENERGY AND NATIONAL SECURITY

Fifty-six percent of the oil used in the United States is imported from foreign sources. According to Richard Truly, director of the National Renewable Energy Laboratory (NREL), the United States consumes more fuel than the next five nations combined and the top four producers of oil are in the Middle East region. According to statistics provided by Senator Susan Collins (R-ME), a member of the Armed Services Committee, the percentage of foreign oil coming from the Persian Gulf could rise to 64 percent by 2020. According to Truly, the average American uses an extraordinarily disproportionate amount of the world's energy supply, consuming six times the world average per capita use of energy. Collins stated that we must "decrease our dependence on foreign oil and diversify our fuel supplies. Our best opportunity to reduce dependence on foreign oil is to increase efficiency."

> *"I believe our energy security is our national security."*
> *-Richard Truly, Director of the National Renewable Energy Laboratory*

A recently released Defense Science Board report found that there is a very strong correlation over the past 50 years between deployment of U.S. forces and upsets in world crude oil prices. According to Truly, energy efficiency is so important to providing a more reliable energy system that he rejects any argument that claims improving fuel efficiency sacrifices performance. The report looked at 100 military weapon systems and did not find one case where improved fuel efficiency did not also improve performance.

Because of the link between national security and energy, it is important for the United States to "increase the robustness of our energy system, encourage distributed generation, increase the number and diversity of

PANELISTS

Senator Susan Collins (R-ME)
Senate Armed Services Committee

Richard H. Truly
Director, National Renewable Energy Laboratory; and retired Vice Admiral of the U.S. Navy

Richard Cowart
Director and Principal, Regulatory Assistance Project; and former Chair of the Vermont Public Service Board

Peter Bradford
Former Chair of the New York State Public Service Commission and the Maine Public Utilities Commission; and former Commissioner of the U.S. Nuclear Regulatory Commission

Bill Holmberg
President, Biorefiner; Board Member, New Uses Council; and retired Marine Corps Lt. Colonel

"The attacks of September 11 have filled us with the fear of wondering when and where the next attack will occur. Our task is to harness that fear to build a stronger nation. With respect to our energy supplies, we need to become more self-sufficient, create a more reliable and secure infrastructure, and diversify our sources, in ways that entail acceptable costs." -Senator Susan Collins (R-ME)

sources and move closer to the source of our power in order to decrease disruptions," stated Collins. Key to energy security is finding the means to provide uninterrupted power to fuel the country's daily activities and economic well-being. This can be done by relying on secure supplies of fuel and electricity and the unimpeded transportation of those energy supplies through transmission lines and pipelines.

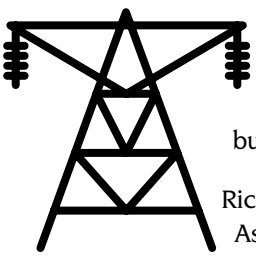
A bipartisan report released in April 2001 by Senators Chuck Schumer (D-NY) and Collins highlighted the risk to consumers from vulnerable energy supplies. Collins stated, unless the nation does more to reduce consumption and diversify our energy supply, consumers could see a doubling of oil prices, a quadrupling of natural gas prices, and painful spikes in electricity prices within ten years. This study did not take into account the vulnerability of our energy system to terrorist attack, such as attacks on pipelines, generation stations, transmission lines and other components of the nation's energy system. "What would happen if terrorists were to attack transmission lines that barely suffice to get the job done now?" asked Collins. "Clearly," says Collins, "we must reexamine potential vulnerabilities in that infrastructure and do what we can to increase security."

Collins added, "The attacks of September 11 have filled us with the fear of wondering when and where the next attack will occur. Our task is to harness that fear to build a stronger nation. With respect to our energy supplies, we need to become more self-sufficient, create a more reliable and secure infrastructure, and diversify our sources, in ways that entail acceptable costs."

ENERGY EFFICIENCY, DISTRIBUTED GENERATION AND RELIABILITY

The terrorists who attacked the United States on September 11th could have just as easily attacked the energy system. According to Truly, such an attack would have come after two years of power shortages, turmoil over utility deregulation, and oil and gas price volatility. The terrible events of September 11th changed the way the United States thinks about energy systems, and the country's reactions to the attack are not temporary or short term.

Disruption of electric power costs many companies staggering amounts of money compared to what they would have paid for reliable generation. Truly believes that the United States' electricity grid was simply not designed for the level of reliability demanded today. Not only is the outdated electrical system overburdened, but the system excessively pollutes the environment. Ninety percent of carbon dioxide emissions from human activity are emitted into the air by burning fossil fuels, claimed Truly.



Rich Cowart, director and principal of the Regulatory Assistance Project, asked the audience to imagine what would happen if the energy system failed in a major urban area: offices and factories would shut down; business activity would halt; people would be stuck in elevators and trains; police and rescue workers would be trying to locate sick and elderly who depend on electricity for assistance; and emergency workers would be deployed to intersections where traffic lights no longer work. The economic impacts would be huge – billions of dollars would be lost in productivity and failed computer systems. According to Cowart, this is not only what would happen in the event of a terrorist attack on the energy sector, but has already occurred in the West and on extremely hot days in metropolitan areas.

Electric utility deregulation has lead to decreased generation investments in energy infrastructure, which has undermined demand side resources and distributed power, which are the most reliable, most dispersed and most resilient resources available to keep electricity flowing, according to Cowart. To increase the reliability and security of the electric power sector, more investment is needed in energy efficiency (using less energy to perform the same work); load management (cycling off during high peak periods to reduce stress on the grid) and distributed generation (smaller energy generation sites closer to the end user and powered by renewable energy).

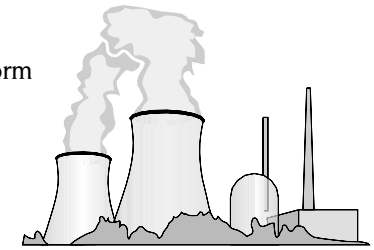
In 1996, electric transmission failed in Oklahoma and California causing seven and a half million customers to lose power. Loss of power and rolling blackouts in major cities are the results of a stressed electric system. Many experts believe increasing energy efficiency is the nation's best defense against an electric system burdened by a stressed distribution system that is vulnerable to terrorist attacks.

The U.S. electric system is experiencing rapid load growth. "Efficient Reliability," a report commissioned by the National Association of Regulatory Commissioners, found that rapid load growth was placing great strain on the nation's electric grids. In order to meet demand for new capacity, enough electrical capacity for nine additional states the size of California will need to be built by 2020. According to Cowart, a large fraction of this new growth is unnecessary. The nation needs to increase the efficiency of motors, lights and appliances. Cowart adds, "We are adding the electrical equivalent of an entire New England every 14 months."

Cowart believes one of the first steps to a more reliable energy system is lightening the load on the system. Ten percent of the load is on the system for only one percent of the year. This results in sharp price spikes. Creating smaller generation sites closer to the source of the electricity would help prevent transmission failures, rolling blackouts and sharp increases in the cost of electricity.

"We're adding the electrical equivalent of an entire New England every 14 months." - Richard Cowart, Director, Regulatory Assistance Project

NUCLEAR POWER



Nuclear power offers security benefits in the form of fuel diversity and independence from oil imports. According to Peter Bradford, former commissioner of the U.S. Nuclear Regulatory Commission, the United States must ask itself whether equivalent benefits can be obtained at less cost from non-nuclear sources or from energy efficiency.

There are some negative attributes to nuclear power, admits Bradford. Nuclear power can contribute to the proliferation of nuclear weapons to nations or terrorist groups. There also is a potential for a catastrophic nuclear accident or event, including sabotage or external attack. According to Bradford, "However unlikely, such an event could kill many people, cause billions of dollars worth of damage, render a large portion of land uninhabitable, and require the closing of a significant portion of our power supply in a short period of time."

During the history of nuclear power, certain events have required changes in the fundamental principles governing the industry, including the abandoning of some technologies and the incurring of great expense, stated Bradford. In 1974, after India tested a nuclear weapon that had been manufactured using some materials provided for peaceful purposes by the United States and Canada, President Ford halted nuclear fuel reprocessing and fast breeder reactor programs. According to Bradford, the Three Mile Island incident had the most significant impact on U.S. policy regarding safety designs. These accidents resulted in significant and costly changes in plant design, control room configuration and offsite emergency planning, which required billions of dollars and led the United States to abandon future development of new facilities.

"The events of September 11 will require fundamental reassessment of several aspects of nuclear regulation in this country. Such reassessment can only increase cost and controversy, the fundamental causes of nuclear power's fall from favor in the 1970s and 1980s." - Peter A. Bradford, former Commissioner of the U.S. Nuclear Regulatory Commission

There is no denying the serious implications from the September 11 attack on a number of the assumptions on which today's power plants have been designed, operated and regulated. The events of September 11, according to Bradford, will require a fundamental reassessment of nuclear power. "When put into the hands of enemies, nuclear power can contribute to sabotage and possibly risk of an attack." According to Bradford, the nuclear industry is faced with "familiar foes," such as uncertainty, controversy and expense, and assumptions of safety, security and training will need to be changed. Bradford states that "new reviews, controversial license extension proceedings and enhanced requirements for new plants are not what an industry that had been celebrating improved performance and rising values expected from this year and next." Bradford further stated that many people are now of the view that future development of new facilities may not be possible.

BIOFUELS

The United States' energy security is jeopardized by centralized and highly vulnerable tankers, pipelines, refineries, electric grids, power plants, and interconnection systems. Energy efficiency and technologies that produce electricity and biofuels from dispersed and renewable energy sources can enhance energy security and reduce the nation's dependency on energy imports, stated Bill Holmberg, president of Biorefiner.

The United States' economic security is also jeopardized by a vulnerable energy system because energy is ever-present in all corners of the nation's economy. Holmberg further explained that increasing production of dispersed and renewable energy systems will help ensure economic stability through the multiplier effect of generating energy domestically and keeping oil dollars in the United States.

As energy efficiency dampens the negative effects of a volatile energy market, it can also create job security and reduce environmental liabilities. Low-cost imported oil has cost thousands of Americans jobs because they have been moved abroad or have "been rendered unnecessary due to low-cost imported oil," according to Holmberg. Diversifying our national energy resources can stimulate new jobs and create a more robust job market. A more diverse national resource base that includes renewable energy technologies will also reduce the number of pollutants and toxins released into the atmosphere every year.

Holmberg stresses the possibility that the United States' food security may also be in jeopardy because of its dependence on transportation fuels, petrochemical fertilizers, and electricity to grow the crops and process, transport and store the goods. According to Holmberg, energy efficiency and renewable energy technologies can reduce this dependence on fossil fuels by limiting energy consumption; promoting advanced farming practices; utilizing wind, solar and geothermal power; and through an increase in production of biofuels, bioenergy and biochemicals from crops and forestry residues that are in close proximity to farming and ranching operations and processing centers.

CONCLUSION

Admiral Truly stated, "We need to raise the bar of what we expect out of our energy systems in decades to come." This can be done through sound and consistent public policy, as well as research and development. Truly emphasized that markets must drive the transition in the nation's energy system from conventional fuels to renewable energy sources and energy efficiency. According to Truly, "renewable energy and energy efficiency are going to play a huge role." Renewable energy technologies include biomass (converted to both fuels and power), geothermal, solar and wind. On the efficiency side, according to Truly, there are a range of opportunities, such as zero net energy buildings, advanced vehicle technologies and fuel cells.

Panelists concluded that there were numerous opportunities to increase the security of the nation's energy system and provide more reliable energy service. In many cases, these solutions exist in already available technologies. Increasing energy efficiency, utilizing distributed generation and increasing the production of biofuels will enable the United States to decrease its dependence on foreign oil and vulnerability to terrorist attack providing the United States and it's economy a more secure and reliable energy system. "I believe our energy security is our national security," stated Truly.

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